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EVALUATING THE COST OF NEGATIVE EXTERNALITY IN COAL MINING REGION OF JHARKHAND: A CASE STUDY OF HAZARIBAGH AND DHANBAD COAL BELTS

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ABSTRACT

The present article is based on the assessment of economic valuation of coal mining in the rural areas of Dhanbad and Hazaribagh District of Jharkhand. The study is based on the valuation of loss of health in the area of study due to mining. The data have been collected from total of 100 households from four mining villages and 50 households from two non-mining (control) villages. The approach that has been used is Cost of illness (COI) approach to analyse the health impact of mining. On the basis of various evidences collected from various documents and reports, various interviews carried out with coal mining officials, doctors interviews based in the hospitals of coal mining areas, field observations of the area of study and interviews held with government department officials. It was found that villages falling into various mining areas were witnessing various health hazards as compared to the villages found in non-mining areas of Dhanbad and Hazaribagh District of Jharkhand. This article is based on various policy framework which are focussing on dealing with the problem of health occurring in the mining areas being considered as negative externality.

KEY WORDS: Negative Externality, health hazard, coal mining, health expenditure, loss of wage.

INTRODUCTION:

There is a strong connection between pollution and health especially in the mining areas and it has been considered as an important issue that needs an adequate concern in a developing country like India. The mining areas throughout the world are witnessing common health hazards related to environment, social and economic impact. The outcome of which is generally ill health due to air, water and noise pollution which further affects the production of agriculture, causes the social impact due to displacement etc. Jharkhand is the mining hub of the nation consisting of various mineral ores and hence it faces all the health problems related to mines. The mining areas of Dhanbad and Hazaribagh are basically the coal belts of the state therefore the health problems in these areas are mostly related to coal mines. The pollution occurring in these mining areas are basically related to water, soil and air which poses further threat to human health and agricultural productivity heavily effecting the economy of the state and overall of the nation. The coal dust and emission of gases from the mines cause air pollution leading to severe threat to lungs and bronchial disorders in the coal mining zones of the state. It not only cause physical damage to the human beings but also causes serious economic loss to the humans due to incurring expenditure on the treatment of these health related problems. On the one hand these mines are the major source of economic benefits to the individual and state on the other hand it poses certain negative externalities in the form of health expenditure. Survival in the mining areas cause serious threat to health due to polluted water and air that can lead to various ailment and waterborne disease like chest infections, allergies, asthma etc. It is really important to calculate the economic valuation of this health loss in the mining areas of Jharkhand.

OBJECTIVE:

I. To evaluate the impact of coal mining on human health of the locality.

II. To analyse the cost of illness due to coal mine pollution of the locality.

METHODOLOGY:

The present study is based on the mining areas of Jharkhand specifically mining areas of Dhanbad and Hazaribagh District. Jharkhand is one of the richest state in India in terms of minerals. Jharkhand possess the coal mines namely Gridih Coalfield, North Karanpura coalfield, Central Coalfields ltd. BCCL, ECL, CIL, NTPC like major mining companies are operating mining activities here. There is availability of huge mineral deposit in the area along with availability of water resource which is a favourable ingredient for industrialization.

The study is based on focussed group discussion, conducting a field survey and collection of data from secondary sources. On the basis of varying distance from the mining areas five villages are taken from within the one km distance from the vicinity of the mines. Double Difference approach has been taken to analyse the before and after and with and without comparison. In order to collect the non-mining village the concerned project authorities were consulted. The total of 100 households from the mining villages and 50 households from non-mining villages were taken. Apart from this discussion outcome with doctors, paramedical staffs, medical stores were also collected in order to obtain overall impact on health care, doctor's fee and types of diseases occurring due to mining activity is studies.

Table 1: sample villages and Nearest Mines

	Villages name	Mines	Distance(km)
1.	Barkagaon	NTPC Pakri Barwadih project	1.5
2.	Sirma	NTPC Pakri Barwadih project	3
3.	Bhowra	BCCL	0.5
4.	sudamdih	BCCL	o.5
5.	Ambajit	Non-mining	10
6.	Govindpur	Non- mining	17

Table 2: Variables and Categories used

Variables	Health impact related Questions
Localities health assessment	Based on questions about their health status and ratings
Major health problems	Based on the type of disease
Occurrence of diseases	Diseases type and its occurrence- daily, weekly, monthly
Cost on health	Treatment cost, travelling cost, loss of working days, income lost, medicine and dietary cost
Annual income	Calculation of income from different sources

Cost of Illness Technique (COI):

In order to study the impact of mining on coal fields of Jharkhand and incurring health expenditure, loss of work, wage and time the cost of illness approach has been used to assess the health cost due to pollution of coal mines. The COI approach studies the loss of productivity and output and the increased expenditure on health care (Freeman, 1993) The total COI is based on direct and indirect cost (BAhl st al, 2004; Kuchler & Golan, 1999) The direct costs comprises of the cost incurred on the medicines, doctor visits and hospitalization while the indirect human capital costs like loss of wage, work and time. The total COI is calculated on the basis of no of days they are unable to work, total no of visits to the doctor and total expenditure on medicines and health.

RESULTS AND DISCUSSIONS:

Characteristics features of the sample villages:

Total six villages were selected four form mining areas and two from non-mining areas and total 150 households were surveyed. 25 from each area. The study is based on mainly two mining district Hazaribagh and Dhabad. So for better results two mining area namely Barkagaon and Sirma and one non mining area named Ambajit are from Hazaribag. Same as two mining area namely Bhowra

and Sudamdih and one non mining area Govindpur are selected from Dhanbad. All villages contains mix population as mentioned in the table below.

Table 3: Characteristics of sample villages

	Villages	Area	Distance(km)	Surveyed households	Social composition	livelihood	Drinking Water	Health centre(km)
1.	Barkagaon	Mining	1.5	25	St, sc, obc	Mine worker, wage labour, cultivator, business	Available (polluted)	1 km
2.	Sirma	Mining	3	25	Sc, st, obc	Mine worker, wage labour, cultivator, business	Avalaible (polluted)	3 km
3.	Bhowra	Mining	0.5	25	Sc, st, obc, gen	Mine worker, wage labour, business, govt. job	Available (highly polluted)	2 km
4.	Sudamdih	Mining	0.5	25	Obc, sc, gen	Mine worker, business, govt. job, wage labour	Available (highly polluted)	3km
5.	Govindpur	Non-mining	17	25	Sc, st, obc, gen	Cultivator, govt. job, private job, business	Available	2km
6.	Ambajit	Non-mining	10	25	Sc ,st, obc	Cultivator, business, wage	available	5 km

The main livelihood of Bhowra and Sudamdih is mine employee, business, wage labours, and govt. jobs. Drinking water is available in all villages but it is found much polluted in mining areas due to mining activities. Mining stock water is supplied to the villagers for drink which cause several diseases. The main livelihood of mining villages is mine work, business, wage labor and government job. Cultivation is also a main livelihood of Barkagaon and Sirma, on the other hand in non-mining area people rely on private job and cultivation. Primary health center is available in all villages within 2-3 km distance but for better treatment they need to travel for 15-30 km. People of Barkagaon and Sirma prefer to go Ranchi Apollo hospital or CCL Centre Nai Sarai, Ramgargh hospital and people of Bhowra and Sudamdih prefer to go BCCL Central Hospital or JALAN Hospitals. The taken mining villages are very near approx. 0.5 to 1.5 km to know the exact t impact of mining activities except Sirma. It is situated 3km far from mines. On the other hand non-mining villages Ambajit and Govindpur are very far approx. 10 km and 17 km from mining villages.

Impact on Health in the study area:

Total 100 households were surveyed in the four mining villages 25 household from each village.80 percent of the people were complaining about health related issues due to mining. Villagers who are very near to the mines were complaining about the coal dust pollution due to transportation and loading unloading to the coal dumps. These dust are blown into the air and causing several diseases. People were suffering with water and airborne diseases like arthritis, chronic asthma bronchitis, weak eyesight, conjunctivitis, skin diseases, liver and kidney problems, cancer etc. Total 336 cases found out of 100 households of different health issues due to coal mine pollution. Whereas in the non- mining villages only 66 cases were found out of 50 households which is very less in the comparison of mining villages. On the other hand in non-mining area only 40 percent people are grumbled with diseases born by mining activities. Cold cough and malaria are common diseases in both mining and non-mining villages. There is inverse relationship with the distance of mine and health related issues. As the distance of villages increases the diseases related to mines decreases.

Table 4: Major diseases in surveyed area

Health Issues	Distance of Mines (KM)				
	0.5	1.5	3	Mining Villages	Non-Mining villages
Asthma	21	8	3	32	4
Skin Diseases	12	7	6	25	3
Gastrointestinal	32	15	7	54	9
Weak eyesight	25	11	9	45	5
liver&kidney proble	17	5	5	27	3
Arthritis	26	9	4	39	7
Fever,cold&cough	42	17	7	66	21
Malaria	26	16	3	38	14
Total	204	88	44	336	66

Source: field survey

Health expenditure in the surveyed area:

The COI method is used in the present study which comprises the direct and indirect expenditures on health like, total doctor visits, expenditures on medicine and goods, travel expenses, laboratory tests, loss of working days and wage etc. For treatment people of study area go to the mine's hospital, local private hospital or doctor's clinic. In mine's hospital doctor's visit is free for the mine employee and their spouse but for others it is 100 rupees per visit. Whereas private doctor's fee is 500 rupees. Mine's hospitals charges 500 rupees for one day admission whereas private hospitals one day bed charge is 1000 to 2000 rupees. Laboratory tests for different diseases cost 100 to 2000 rupees. Auto rickshaw or private car charges approx. 300 to 1000 rupees for local hospitals. But for major diseases like asthma, liver and kidney problems people prefer to go to state central hospital or advanced facilitated hospitals for which they expenses 5000 to 10,000 rupees on travel. Cost on travel depends on no. of doctor visits, distance of hospitals or medium of travel.

Table 5: Average Health Expenditures in the Surveyed Area

Expenditures (rupees)	Distance of Villages (km)				
	0.5	1.5	3	Mining Villages	Non-mining villages
Doctor's Fee	875.87	573.43	525.78	657.43	504.47
Medicine	6748.5	6345.07	4275.34	5854.37	3425.74
Laboratory Tests	750	640.43	575.86	678.75	475.34
Travel expenses	2540.63	2175.03	1875.47	2048.34	1945.46
Hospital expenses	6550.78	5684.74	3487.43	5342.54	3442.74
Dietary expenses	1564.03	1326.24	1230.56	1435.68	1275.39
loss of wages	3475.9	2887.56	2376.45	2967.96	1475.43

Source-field survey

It was found in the field survey that the villagers in the distance of 0.5 to 1.5km of mines was more frequent to doctor visits. The diseases rate was also high in these villages. The average doctors' fee for the mining villages was approx. 650 rupees whereas it was 500 in non-mining villages.travel expenses was also high in mining villages. There was huge difference on hospital expenses in mining and non-mining villages. Average Loss of working days and wage was also high in comparison to non-mining villages. In mining areas it was 3475.90 whereas in control villages it was only 1475.43 rupees.

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